

ncISO, Metadata, Discovery and GIS in Disaster Response

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Fukushima Daiichi Nuclear Plant

Japan's largest ongoing threat is at this nuclear power plant. There have been explosions at four of its six reactors and all four have released some radioactive material.



What do we need to do?

Locate relevant data

Make informed **decisions**
based on analysis of the data

Metadata supports both!

Where will the radiation go?

- ✓ **Find relevant datasets.**
 - ISO 19115-2 multiple extents
 - Responsible Party
 - Keywords
- ✓ **Run models on top of the data**
 - Temporal dimensions
 - Services
- ✓ **Visualize/communicate results.**
 - Lineage and uncertainty**

Tools to find relevant datasets?

- ✓ **Metadata catalogs** can be used to locate observation based and ancillary datasets needed in the analysis
- ✓ Scientific data for the ocean and climate modeling often stored as **NetCDF** and Served via **THREDDS**
- ✓ **ncISO** generates ISO metadata from THREDDS

THREDDS/NetCDF



‘NetCDF (network Common Data Form) is a set of software libraries and machine-independent data formats that support the creation, access, and sharing of array-oriented scientific data.’

Data Storage:

In-situ measurements - POINT/LINE/POLY

Model results - GRID/RASTER

Communities:

Atmospheric

Oceanographic

THREDDS/NetCDF



NetCDF is an accepted standard by the
Open Geospatial Consortium (OGC)

Client Software

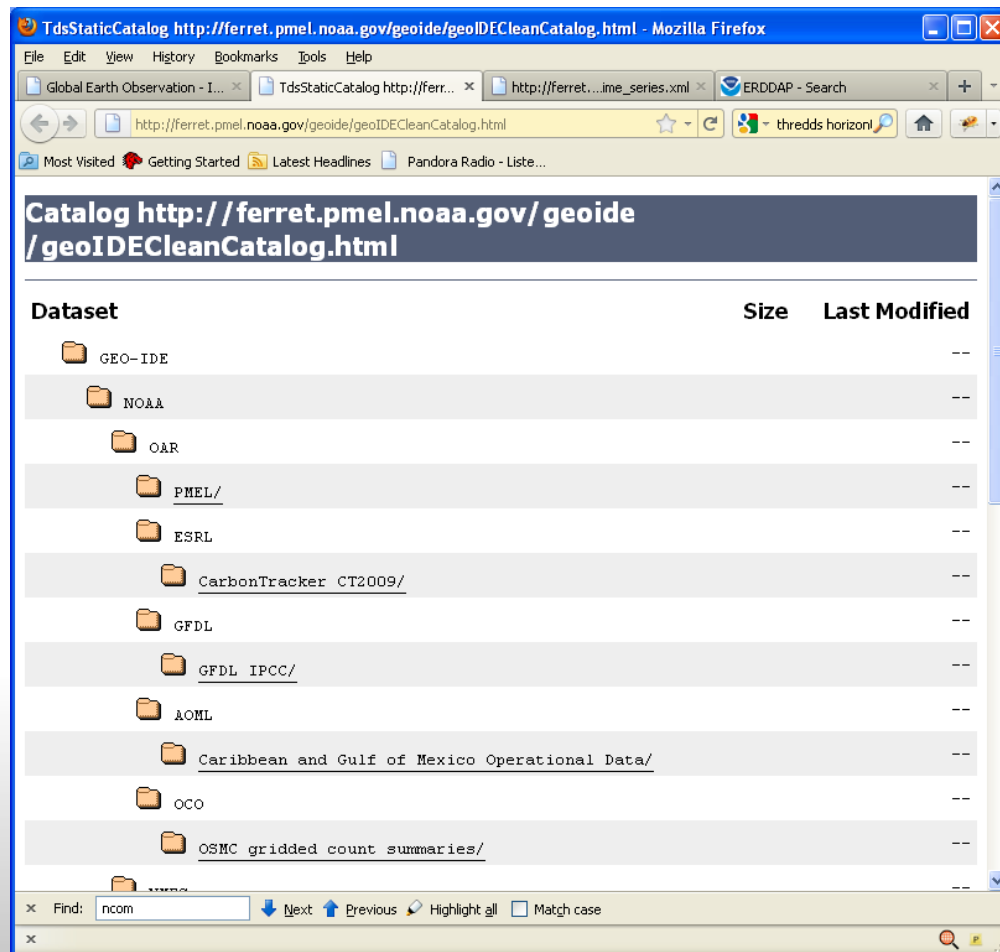
- NetCDF library for reading and writing programmatically
- GeoSpatial Data Abstraction Library (GDAL) support
- Integrated Data Viewer (IDV) client viewer application
- ArcGIS

Server Applications – Data Distribution

- Thematic Realtime Environmental Distributed Data Services (THREDDS)
- Open-source Project for a Network Data Access Protocol (OpenDAP)

NOAA's Global Earth Observation Integrated Data Environment

- A framework for serving NOAA's environmental data



<http://ferret.pmel.noaa.gov/geoide/geoIDECleanCatalog.html>

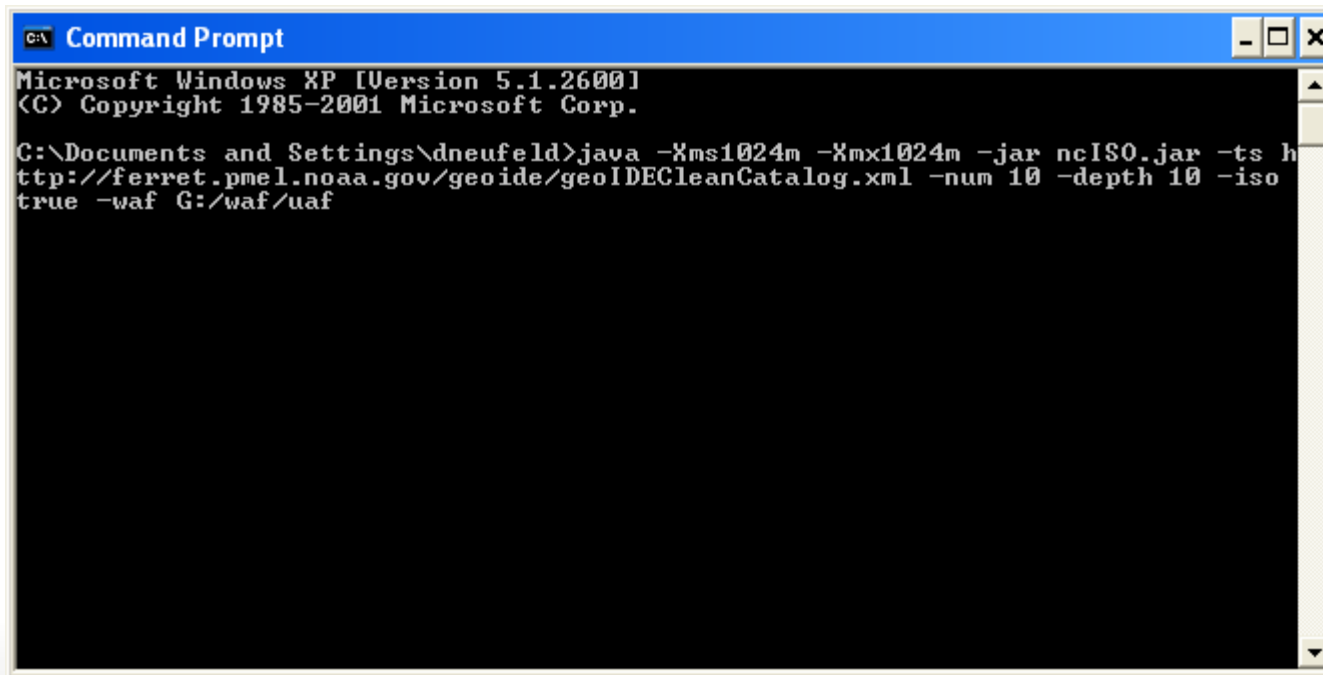
- Translates NCML, file and catalog metadata into ISO 19115-2
- Provides metadata services for THREDDS
- Provides export to WAF capability

Running nclSO

- ✓ Download nclSO
- ✓ Point to a THREDDS catalog with datasets of interest
- ✓ Generate a Web Accessible Folder containing ISO Metadata and review its content
- ✓ Explore options to improve metadata and rerun nclSO

Rubrics and ISO

NCOM/Fukushima dataset example



```
C:\> Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\dneufeld>java -Xms1024m -Xmx1024m -jar ncISO.jar -ts h
ttp://ferret.pmel.noaa.gov/geoide/geoIDECleanCatalog.xml -num 10 -depth 10 -iso
true -waf G:/waf/uaf
```

NCML

Rubric

ISO

[more info - http://www.ngdc.noaa.gov/eds/tds/](http://www.ngdc.noaa.gov/eds/tds/)

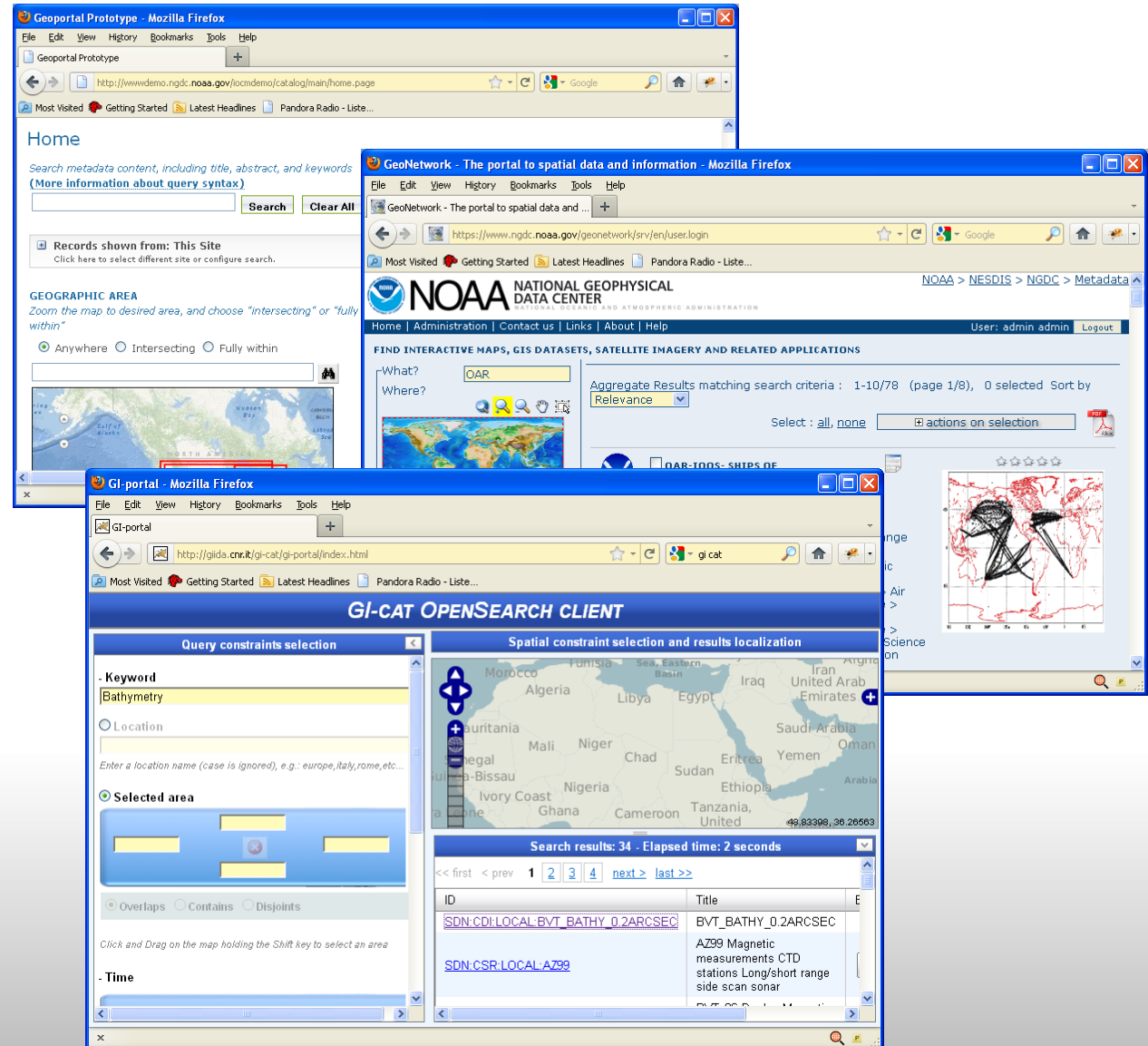
- Supports a variety of metadata formats
- ISO, FGDC, Dublin Core
- Populate catalog
 - harvesting from internal and external metadata WAFs
 - services

Open Source Metadata Catalogs

Geoportal

GeoNetwork

GI-Cat



Harvest Metadata into Geoportal


Geoportal Prototype - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Geoportal Prototype x OPeNDAP Dataset Query Form x TdsStaticCatalog http://www.ngdc.noaa... x +

http://localhost:8080/geoportal/catalog/publication/addMetadata.page

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HOME SEARCH BROWSE ADMINISTRATION

[Manage](#) [Add](#)

Register Resource

ID: Value will be generated upon saving.
Resource UUID: Value will be generated upon saving.

Protocol Type: ☐ URL ☐ ArcGIS ☐ Esri MS ☐ OAI ☒ WAF ☐ CSW

Host Url:

Title:

User Name:

User Password:

Resource ownership:

Purpose of the registration:

☒ Allow this resource to be found when searching for metadata
☐ Include this endpoint on the federated search list
☒ Allow this resource to be synchronized at an interval

Make Decisions

- ✓ Search catalog
- ✓ Download dataset of interest
- ✓ Use data to forecast radiation dispersal using GNOME, or ArcMap

Search & Download

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Geoportal Prototype

http://localhost:8080/geoportal/catalog

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HOME SEARCH BROWSE ADVANCED

Search

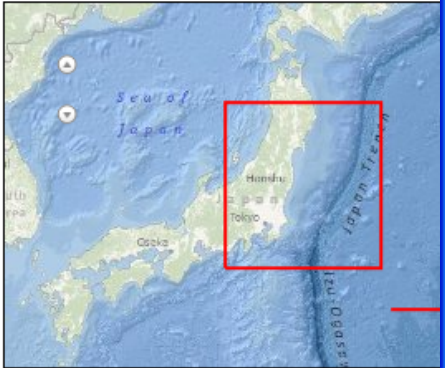
water velocity

Records shown from: This Site
Click here to select different site or configure search

Additional Options
Clear

WHERE

☐ Anywhere ☐ Intersecting ☒ Fully within



Catalog Services - Mozilla Firefox

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Geoportal Prototype Catalog Services

thredds/dodsC/ncom_fukushima_agg/catalog.html?dataset=ncom_fukushima_agg/Fukushima_best.ncd

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NGI

EDAC
ecosystem data assembly center

EDAC
THREDDS Data Server

Catalog http://edac-dap3.northerngulfinstitute.org/thredds/catalog/ncom_fukushima_agg/catalog.html

Dataset: Fukushima/Best Time Series

- Data type: GRID
- ID: ncom_fukushima_agg/Fukushima_best.ncd

Documentation:

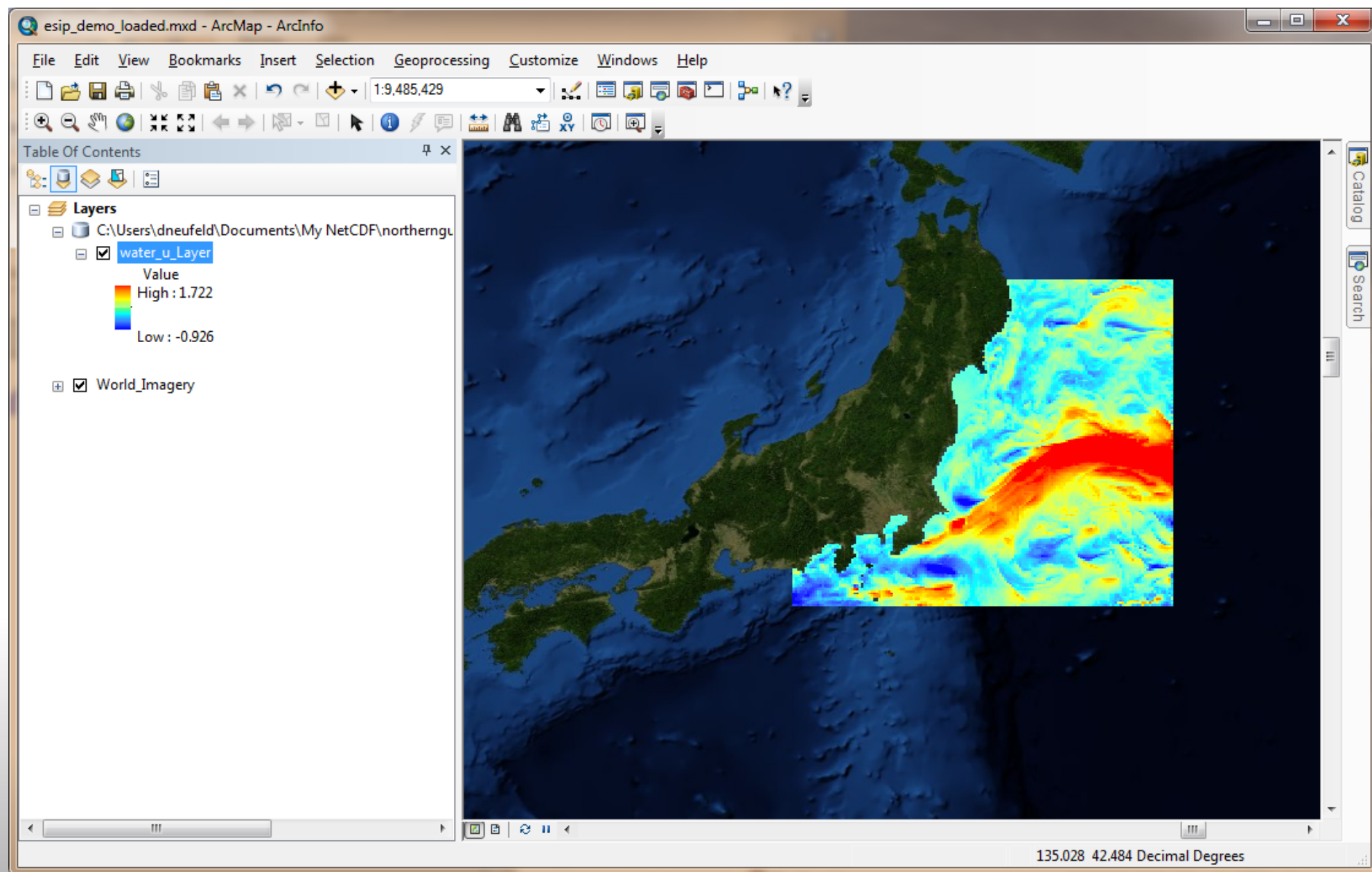
- **summary:** Best time series, taking the data from the most recent run available.
- **summary:** Fukushima Aggregation

Access:

1. **OPENDAP:** [/thredds/dodsC/ncom_fukushima_agg/Fukushima_best.ncd](http://thredds/dodsC/ncom_fukushima_agg/Fukushima_best.ncd)
2. **NCML:** [/thredds/ncml/ncom_fukushima_agg/Fukushima_best.ncd](http://thredds/ncml/ncom_fukushima_agg/Fukushima_best.ncd)
3. **UDDC:** [/thredds/uddc/ncom_fukushima_agg/Fukushima_best.ncd](http://thredds/uddc/ncom_fukushima_agg/Fukushima_best.ncd)
4. **ISO:** [/thredds/iso/ncom_fukushima_agg/Fukushima_best.ncd](http://thredds/iso/ncom_fukushima_agg/Fukushima_best.ncd)
5. **WMS:** [/thredds/wms/ncom_fukushima_agg/Fukushima_best.ncd](http://thredds/wms/ncom_fukushima_agg/Fukushima_best.ncd)
6. **NetcdfSubset:** [/thredds/ncss/grid/ncom_fukushima_agg/Fukushima_best.ncd](http://thredds/ncss/grid/ncom_fukushima_agg/Fukushima_best.ncd)

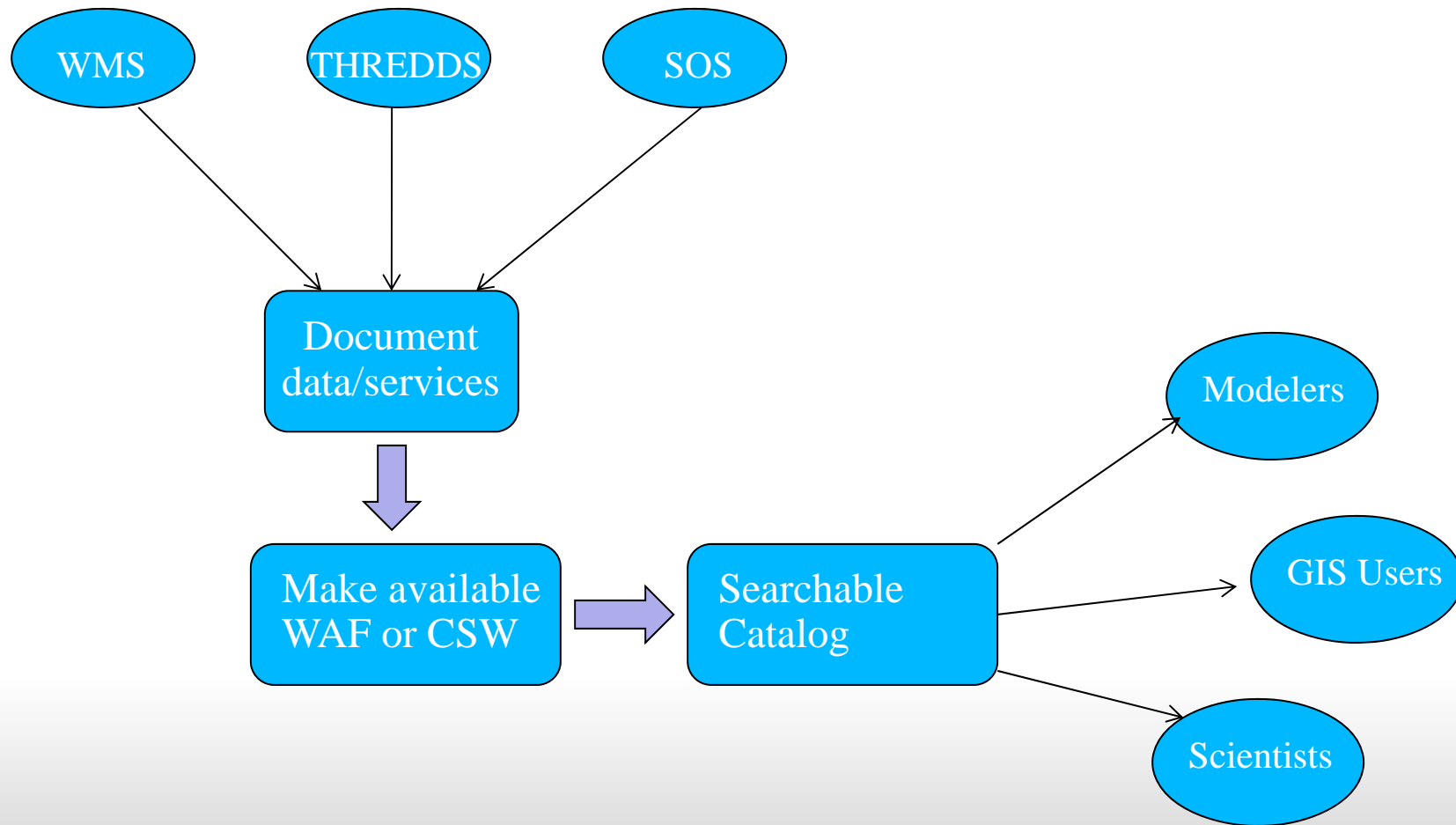
Variables:

Visualize Radiation Dispersal



Workflow diagram:

Pulling it all together for improved response



Next Steps for nclSO

- Differentiate between model and in-situ data
- Allow metadata caching to improve performance

Questions?